

INFORMATION  
ONLY

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## Rocky Flats Environmental Technology Site

4-I60-ENV-OPS-FO.42

REVISION 1

CHEMICAL CLEANING OPERATIONS  
CONSOLIDATED WATER TREATMENT FACILITY

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DOE RFFO/ER Concurrence on file ☐ Yes ☐ No ☒ NAEnvironmental Protection Agency Approval Received ☐ Yes ☐ No ☒ NAResponsible Organization. Environmental Restoration Program Division Effective Date 2/28/96

CONCURRENCE BY THE FOLLOWING DISCIPLINES WILL BE DOCUMENTED IN THE PROCEDURE HISTORY FILE

Data Management and Reporting Services  
Environmental Operations Management  
Waste Management  
Industrial Hygiene  
Occupational Safety  
Quality Assurance  
Radiological Health and Engineering

## USE CATEGORY 3

ORC review not required

The following have been incorporated in this revision  
N/A

DOCUMENT CLASSIFICATION  
REVIEW WAIVER PER  
CLASSIFICATION OFFICE

**LIST OF EFFECTIVE PAGES**

| <u>Pages</u> | <u>Effective Date</u> | <u>Change Number</u> |
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1. **PURPOSE**

This procedure describes the administrative and operations steps used at the Rocky Flats Environmental Technology Site (RFETS) for chemical cleaning operations for the Microfiltration (MF) system of the Consolidated Water Treatment Facility (CWTF). The operating instructions include detailed descriptions and instructions for safe chemical cleaning operations.

This procedure implements the requirements for chemical cleaning of the microfiltration membranes in the MF treatment system at the CWTF. This procedure was established to ensure that the chemical cleaning of the microfiltration membranes in the treatment system is accomplished in a uniform and safe manner.

2. **SCOPE**

This procedure applies to Environmental Operations Management (EOM) employees and subcontractor personnel.

This procedure addresses the following topics:

- Automatic cleaning of microfiltration membrane filtration section
- Manual cleaning of microfiltration membrane filtration section
- Disposal of cleaning solutions
- Plugged modules

3. **OVERVIEW**

The Microfiltration treatment system, a subsystem of the Consolidated Water Treatment Facility, consists of a chemical precipitation system, a microfiltration membrane system, chemical handling equipment and pumps and a pH neutralization system for treated effluent. The treatment system is contained in two trailers (T900A and T900B) located south of the 891 Treatment Facility and is designed to process in the range of 40-70 gpm of contaminated water. The microfiltration membrane system is located in Trailer T-900A.

The microfiltration system includes an integral cleaning unit for filter membrane cleaning. The cleaning unit consists of a cleaning tank, water flush tank, and cleaning pump with automatic protective devices to ensure that the pump is operated properly. A Programmable Logic Controller (PLC) and piping with automatically-operated valves integrates the cleaning unit in place with the membrane microfiltration system to perform the cleaning steps in an efficient and safe manner.

Periodic cleaning of the microfiltration membranes is part of normal operating procedures. Routine chemical cleaning to restore filtration flow rate is part of the treatment system's operating schedule. The cleaning cycle varies, depending upon precipitation and the quality of the surface water influent to the system. Cleaning may also be required following an operational upset or inadvertent excursions from the normal operating conditions.

**4 LIMITATIONS AND PRECAUTIONS**

- Operators shall be trained in the safe handling of all reagents used during chemical cleaning operations of the microfiltration system
- All operators shall receive training on the requirements of the Consolidated Water Treatment Facility HASP

**5 PREREQUISITE ACTIONS**

**5 1 Field Preparation**

**CWTF Responsible Manager**

- [1] Ensure that the cleaning operations are logged on the Plan of the Day (POD)

**Lead Operator/Operator**

- [1] Ensure that either tank T-200 or T-201 is at a low liquid level before the cleaning of microfiltration membranes. This allows sufficient capacity for storage of influent water while membrane cleaning operations proceed
- [2] Ensure that the system is shut down in accordance with 4-I59-ENV-OPS-FO 41 Chemical Precipitation/Microfiltration, System Normal Operations Consolidated Water Treatment Facility
- [3] Ensure that the level in the concentration tank TK-8 is at the low limit. This provides sufficient tank capacity to accept the concentrate displaced from the modules prior to cleaning
- [4] Ensure that the cleaning tanks contain the appropriate cleaning solution(s) as prepared in accordance with 4-I63-ENV-OPS-FO 45 Chemical Handling and Mixing Operations Consolidated Water Treatment Facility

**Health and Safety Specialist**

- [1] Conduct a pre-shift safety briefing in accordance with the requirements of the HASP covering chemical cleaning operations prior to the chemical cleaning of the microfiltration membranes

**6 INSTRUCTIONS**

**6 1 Automatic Cleaning**

**NOTE 1** *Placing the control switch for a valve or pump in HAND will illuminate the control switch indicating the valve is open or the pump is running*

**NOTE 2** *Placing the control switch for a valve or pump in AUTO may or may not illuminate the control switch and cause the valve or pump to operate depending on control logic*

MICROFILTRATION SYSTEM  
CHEMICAL CLEANING OPERATIONS  
CONSOLIDATED WATER TREATMENT FACILITY

4-160-ENV-OPS-FO 42  
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6.1 Automatic Cleaning (continued)

Operator

- [1] Verify that all appropriate prerequisite actions in Section 5, Prerequisite Actions have been completed and recorded in the CWTF Operations Log Book.
- [2] Don the appropriate Personal Protective Equipment (PPE) as required in the HASP
- [3] To prepare for AUTO CLEAN perform the following:
  - [A] Verify the following pump control switches are in OFF
    - FP-1
    - CP-1
    - TP-11-1
    - PP-8-1
  - [B] Verify the following manual valves are CLOSED.
    - MV-902
    - MV-903
    - MV-904
    - MV-905
    - MV-906
    - MV-907
    - MV-929

**NOTE** Based on the type of cleaning to be performed, refer to 4-163-ENV-OPS-FO 42, Chemical Handling and Mixing Operations for the mixing of cleaning chemicals. Chemicals should be added to TK-9 (Chemical Cleaning System Chemical Tank) at this point in the procedure. Chemicals used for cleaning include, dilute sodium hypochlorite, dilute hydrochloric acid, and dilute hydrogen peroxide.

**NOTE** For cleaning with dilute sodium hypochlorite solutions, five 55 gallon drums of approximately 10% sodium hypochlorite (bleach) are added to an empty TK-9. The drum contents are transferred by electric drum pump, used in cleaning and returned to the drums by transferring with the same electric pump. Use the following steps to prepare the system for a sodium hypochlorite cleaning:

- [4] Open the TK-9 access lid.
- [5] Transfer the appropriate amount of sodium hypochlorite solution (typically five 55 gallon drums) to TK-9 by electric drum pump as follows:
  - [A] Place the electric drum pump in the opening at the top of the drum.
  - [B] Verify that the drum pump control switch is OFF
  - [C] Plug the drum pump power cord into a 120V receptacle
  - [D] Attach the 1 inch poly hose to the discharge of the drum pump.
  - [E] Run the poly hose from the drum pump into the TK-9 access lid opening

6 1 Automatic cleaning (cont.)

[F] Place the drum pump control switch to ON and pump the contents from the drum into TK-9

[G] WHEN the drum is empty  
OR the required volume has been pumped,  
THEN place the drum pump control switch to OFF

[6] Repeat steps [5] [A] through [G] until the proper amount of chemical is in TK-9

**NOTE** For cleaning with dilute hydrochloric acid solutions perform steps [5] [A] through [G] and [6] as above

[7] Rinse the drum pump stem, and flush the drum pump and hose into TK-9 after transferring chemical to TK 9 as follows

[A] Place drum pump into a five gallon rinse water bucket containing approximately 3 gallons of water

[B] Run the poly hose from the drum pump into the TK-9 access lid opening

[C] Use a squirt bottle filled with clean water to rinse the outer portion of the pump stem

[D] Place the drum pump control switch to ON and pump the rinse water from the five gallon container into TK-9

[E] WHEN the five gallon container is empty  
THEN place the control switch for the drum pump to OFF

[F] Drain the transfer hose into TK-9 and store properly

[G] Excess water may be poured directly into TK-9

**NOTE** For cleaning with hydrogen peroxide solutions perform the following steps for transfer of chemicals

[8] Ten to fifteen gallons of 35% hydrogen peroxide will be added to approximately 250 gallons of water in TK 9 Chemical transfer may be done as described above in a drum transfer operation or hydrogen peroxide may be transferred from the 891 bulk hydrogen peroxide tank (T-120)

[9] To transfer hydrogen peroxide from a drum into TK-9 perform steps [5] [A] through [G] and [7] [A] through [G]

[10] To transfer hydrogen peroxide from the bulk storage tank (T-120) in 891 perform the following steps

[A] Open valve V-81 inlet to transfer pump MP-300-1

[B] Open valve MV-9030 on discharge side of pump MP-300-1

6.1 Automatic cleaning (cont.)

- [C] Open MV-933 (chemical inlet) at TK-9
- [D] Ensure that valve MV-934 (chemical inlet) at TK-10 is closed.
- [E] Note the start level in T-120 and determine a finish level (marks on tape on the side of the tank) which will indicate that approximately ten to fifteen gallons of hydrogen peroxide has been delivered to TK-9 NOTE: 1 in. = 9.26 gal.
- [F] Place the switch on MP-300-1 to ON
- [G] Monitor the level in T-120 until the volume of chemical has been transferred.
- [H] Place the pump switch to OFF, close valves V-81, MV-9030 and MV-933

**WARNING**

If sodium hypochlorite was used as a cleaning agent, a thorough recirculation of at least 3 min. during the WATER FLUSH cycle is required to prevent the formation of toxic chlorine gas. (Mixing acid and sodium hypochlorite can result in the formation of toxic chlorine gas.)

**WARNING**

Inhalation of chlorine gas can be fatal.

**CAUTION**

A thorough recirculation (at least 3 min.) during the WATER FLUSH cycle is required if sodium hypochlorite was used as a cleaning agent. Sodium hypochlorite may precipitate any dissolved metal within the membranes and cause plugging.

**NOTE** *Rinse water that has a high or low pH may need to be transferred to Reaction tank TK-1 or TK-2 during process operations to avoid pH fluctuations in the Reaction Tank due to residual cleaning solutions in the rinse water. Transfer is described in Step 6.1 [22][L]*

- [11] IF Step 6.1 [22][L] is going to be performed during automatic cleaning operations,  
THEN perform one of the following.
  - [a] IF transferring to TK-1,  
THEN open MV-968
  - [b] IF transferring to TK-2,  
THEN open MV-969
- [12] Place the Filtrate Transfer Pump TP-11-1 control switch in AUTO



6 1 Automatic Cleaning (continued)

Operator (continued)

- [13] Verify tank TK-11 contains at least 56 6 in of water The Programmable Logic Controller (PLC) will not let the system enter AUTO CLEAN unless TK-11 contains this minimum amount of water
- [14] Ensure the pH in TK-11 is 6 5 to 9 0 s u
- [15] Verify the following system automatic valves are in AUTO
  - AV-908
  - AV-909
  - AV-911
  - AV-912
  - AV-913
  - AV-914
  - AV-915
  - AV-916
  - AV-917
  - AV-918
  - AV-919
  - AV-930
  - AV-935
- [16] Verify Cleaning Pump CP-1 discharge valve MV-910 is OPEN
- [17] Place the CLEANING PUMP CP-1 control switch in AUTO

**NOTE 1** *At any time during the automatic cleaning process a cycle can be temporarily paused by actuating the yellow cleaning cycle hold switch If the red cleaning cycle stop button is depressed the cleaning cycle is canceled and to reinitiate a cleaning water flush) may be accessed by depressing the green CLEANING CYCLE START/STEP pushbutton while the cleaning cycle is paused Disrupting the automatic cleaning process is not recommended for routine use*

**NOTE 2** *During cleaning there are 5 alarm conditions which will place the cycle in a "HOLD" condition Any other alarm conditions will sound as in normal operation but will not affect the cleaning cycle*

- Low seal water pressure (if CP-1 is running)
- Concentration TK-8 high level alarm.
- Cleaning TK-9 high level alarm
- Cleaning TK-10 high level alarm
- Neutralization Tank TK-11 level less than 56 6 inches

- [18] Log each chemical cleaning cycle on the CWTF Cleaning Log Sheet (See Appendix 1 for Sample )
- [19] Push the CLEANING CYCLE START/STEP pushbutton to initiate an automatic cleaning cycle

6.1 Automatic cleaning (cont.)

[20] Observe the following STEP 1 SOLIDS FLUSH (Solids back to TK-8) automatic actions occur in sequence

- [A] AV-919 closes
- [B] The following valves open. (3-sec time delay for valve actuation. All other automated valves are closed.)
  - AV-908
  - AV-913
  - AV-918
  - AV-930
- [C] Cleaning Pump CP-1 starts and flushes water from TK-10 back to TK-8
- [D] WHEN TK-10 reaches low level,  
THEN Cleaning Pump CP-1 stops.
- [E] AV-913 closes.
- [F] Time delay (30 min. drain back to TK-10).
- [G] AV-918 and AV-930 close (3-sec time delay for valve actuation)

**NOTE** *Upon entering the cleaning cycle, Transfer Pump TP-11-1 is shut off automatically by the PLC and controlled by the level controls in TK-9, TK-10, TK-11*

[21] Observe the following STEP 2 CHEMICAL CLEAN (Recirculation to TK-9) automatic actions

- [A] The following valves open (3-sec time delay for valve actuation):
  - AV-909
  - AV-912
  - AV-915
  - AV-916
- [B] Cleaning Pump CP-1 starts and recirculates cleaning solution for 14 min.
- [C] Cleaning Pump CP-1 stops.
- [D] AV-912 closes.
- [E] Time delay (2 min. drain back to TK-9)
- [F] AV-915 and AV-916 close (3-sec time delay for valve actuation).

6 1 Automatic Cleaning (continued)

Operator (continued)

**WARNING**

If sodium hypochlorite was used as a cleaning agent, a thorough recirculation of at least 3 min. during the WATER FLUSH cycle is required to prevent the formation of toxic chlorine gas. (Mixing acid and sodium hypochlorite can result in the formation of toxic chlorine gas.)

**WARNING**

Inhalation of chlorine gas can be fatal.

**CAUTION**

A thorough recirculation (at least 3 min.) during the WATER FLUSH cycle is required if sodium hypochlorite was used as a cleaning agent. Sodium hypochlorite may precipitate any dissolved metal within the membranes and cause plugging.

- [22] Observe the following STEP 3 WATER FLUSH (recirculation to TK-10) automatic actions
- [A] The following valves open
    - AV-914
    - AV-917
  - [B] Filtrate Transfer Pump TP 11-1 starts and pumps water from TK-11 until TK-10 reaches full level (TP-11 1 control switch must be in the AUTO position )
  - [C] WHEN TK-10 reaches full level  
THEN the Filtrate Transfer Pump TP-11-1 stops
  - [D] AV-914 closes
  - [E] The following valves open (3-sec time delay for valve actuation)
    - AV-913
    - AV-918
  - [F] Cleaning Pump CP-1 starts and recirculates flush water from and to TK-10 for 3 min
  - [G] Cleaning Pump CP-1 stops
  - [H] AV-913 closes
  - [I] Time delay (30 min drain back to TK-10)
  - [J] AV-908 closes
  - [K] AV-911 and AV-913 open (3-sec time delay for valve actuation)

6.1 Automatic Cleaning (continued)

Operator (continued)

[L] Cleaning Pump CP-1 starts and pumps rinse water to reaction TK-1 or TK-2 until low level is reached in TK-10. This step may be accomplished as needed or the cycle may be interrupted at this point by depressing the CYCLE STOP push button.

[M] The following valves close (3-sec time delay for valve actuation)

- AV-909
- AV-911
- AV-913
- AV-917
- AV-918

[23] Adjust the pH in TK-8 to the expected operating range of 9.0 to 10.5 su by the manual addition of lime.

**NOTE** *At the end of the cleaning cycle all automated valves close with the exception of AV-919 which is open during normal operation.*

[24] Record all activities in the CWTF Operations Log Book.

6.2

Manual Cleaning

**NOTE 1** *Placing the control switch for a valve or pump in HAND will illuminate the control switch, indicating the valve is open or the pump is running.*

**NOTE 2** *Placing the control switch for a valve or pump in AUTO may or may not illuminate the control switch and cause the valve or pump to operate, depending on control logic.*

**Operator**

[1] Verify that all appropriate prerequisite actions in Section 5, Prerequisites have been completed and recorded in the CWTF Operations Log Book.

[2] Don the appropriate Personal Protective Equipment (PPE) as required in the HASP.

[3] Perform the following to prepare for manual cleaning:

[A] Verify the following pump control switches are in OFF

- FP-1
- CP-1
- TP-11-1
- PP-8-1

6 2 Manual cleaning (cont.)

- [B] Verify the following manual valves are CLOSED
  - MV-902
  - MV-903
  - MV-904
  - MV-905
  - MV-906
  - MV-907
  - MV-929
- [C] Verify tank TK-11 contains at least 56 6 in of water
- [D] Ensure the pH in TK-11 is 6 5 to 9 0 su
- [E] Verify the PROCESS PUMP PP-8-1 control switch is in OFF
- [F] Verify the following system automatic valves are in OFF
  - AV-908
  - AV-909
  - AV-911
  - AV-912
  - AV-913
  - AV-914
  - AV-915
  - AV-916
  - AV-917
  - AV-918
  - AV-919
  - AV-930
  - AV-935
- [G] Verify the Cleaning Pump CP-1 discharge valve MV-910 is OPEN
- [H] Verify the CLEANING PUMP CP-1 control switch is in OFF

**NOTE** *During cleaning there are 5 alarm conditions for which cleaning steps should be placed on hold until the abnormal condition is rectified Any other alarm conditions will sound as in normal operation but will not affect the cleaning*

- *Low seal water pressure (if CP-1 is running)*
- *Concentration TK-8 high level alarm*
- *Cleaning TK-9 high level alarm*
- *Cleaning TK-10 high level alarm*
- *Neutralization Tank TK-11 level less than 56 6 inches*

- [4] Log each chemical cleaning cycle on the CWTF Cleaning Log Sheet

**NOTE** *Based on the type of cleaning to be performed refer to 4-I63-ENV-OPS-FO 42, Chemical Handling and Mixing Operations for the mixing of cleaning chemicals Chemicals should be added to TK-9 or TK-10 at this point in the procedure.*

6.2 Manual Cleaning (continued)

Operator (continued)

- [5] Perform the following STEP 1 SOLIDS FLUSH (Solid back to TK-8) manual actions in sequence at the control panel in T900A.

- [A] Place the control switch for the following valves in HAND
- AV-908
  - AV-913
  - AV-918
  - AV-930
- [B] Place the CLEANING PUMP CP-1 control switch in HAND and flush back to TK-8
- [C] WHEN TK-10 reaches low level,  
THEN place the CLEANING PUMP CP-1 control switch in OFF.
- [D] Place the AV-913 control switch in OFF
- [E] Allow drain back to TK-10 for 30 min.
- [F] Place the control switch for the following valves in OFF
- AV-918
  - AV-930

- [6] Perform the following STEP 2 CHEMICAL CLEAN (Recirculation to TK-9) manual actions in sequence at the control panel in T900A.

- [A] Place the control switch for the following valves in HAND
- AV-909
  - AV-912
  - AV-915
  - AV-916
- [B] Place the CLEANING PUMP CP-1 control switch in HAND
- [C] Recirculate cleaning solution for at least 14 minutes.

NOTE. *The cleaning period can be extended, depending on the degree of fouling*

- [D] After 14 min, place the CLEANING PUMP CP-1 control switch in OFF
- [E] Place the AV-912 control switch in OFF
- [F] Allow drain back to TK-9 for 2 to 30 minutes.
- [G] Place the control switch for the following valves in OFF
- AV-915
  - AV-916

**WARNING**

If sodium hypochlorite was used as a cleaning agent, a thorough recirculation of at least 3 min during the WATER FLUSH cycle is required to prevent the formation of toxic chlorine gas. (Mixing acid and sodium hypochlorite can result in the formation of toxic chlorine gas.)

**WARNING**

Inhalation of chlorine gas can be fatal

**CAUTION**

A thorough recirculation (at least 3 min ) during the WATER FLUSH cycle is required if sodium hypochlorite was used as a cleaning agent. Sodium hypochlorite may precipitate any dissolved metal within the membranes and cause plugging.

- [7] Perform the following STEP 3 WATER FLUSH (Recirculation to TK-10) manual actions in sequence at the control panel in T900A
- [A] Place the control switch for the following valves in HAND
    - AV 914
    - AV 917
  - [B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND and fill TK-10
  - [C] WHEN TK 10 reaches full level  
THEN Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF
  - [D] Place the AV-914 control switch in OFF
  - [E] Place the control switch for the following valves to HAND
    - AV 913
    - AV-917
    - AV-918
  - [F] Place the CLEANING PUMP CP-1 control switch in HAND
  - [G] Recirculate cleaning solution for 3 min
  - [H] After 3 min, place the CLEANING PUMP CP-1 control switch in OFF
  - [I] Place the AV-913 control switch in OFF
  - [J] Allow 30 min for flush water to drain back to TK-10
  - [K] Place the AV-908 control switch in OFF

6.2 Manual Cleaning (continued)

- [L] Place the control switch for the following valves in **HAND**
- AV-911
  - AV-913

**NOTE** *Rinse water that has a high or low pH may need to be transferred to Reaction Tank TK-1 or TK-2 during process operations to avoid pH fluctuations in the Reaction Tank due to residual cleaning solutions in the rinse water*

- [M] IF transferring to TK-1,  
THEN open MV-968

- [N] IF transferring to TK-2,  
THEN open MV-969

- [O] Place the **CLEANING PUMP CP-1** control switch in **HAND** and pump rinse water from TK-10 to reaction TK-1 or TK-2.

This step may be accomplished as needed or the cycle may be interrupted at this point.

- [P] WHEN TK-10 reaches low level,  
THEN place the **CLEANING PUMP CP-1** control switch in **OFF**

- [Q] Place the control switch for the following valves in **OFF**
- AV-909
  - AV-911
  - AV-913
  - AV-917
  - AV-918

- [9] IF the pH in TK-8 is **NOT** in the expected operating range of 9.0 to 10.5 su,  
THEN adjust the pH in TK-8 by the manual addition of lime.

**NOTE** *At the end of the cleaning cycle all automatic valves should be in **OFF** with the exception of AV-919 which is open during normal operation*

- [10] Verify that the following system automatic valves are in **OFF**
- AV-908
  - AV-909
  - AV-911
  - AV-912
  - AV-913
  - AV-914
  - AV-915
  - AV-916
  - AV-917
  - AV-918
  - AV-919
  - AV-930
  - AV-935

- [11] Close MV-910



6 2      **Manual Cleaning (continued)**

[12]    Record all activities in the CWTF Operations Log Book

6 3      **Transfer of Cleaning Solutions for Reuse**

6 3 1    **Transfer of Acid Cleaning Solution and Clean Water Rinse for Reuse**

The cleaning solution in TK-9 and the solution in TK-10 are transferred by the Operator to Reaction Tank TK-1 OR TK-2 after use

Perform this step during processing operations to control pH fluctuations in TK-1 OR TK-2

**NOTE 1**    *Placing the control switch for a valve or pump in HAND will illuminate the control switch indicating the valve is open or the pump is running*

6 3 1    **Transfer of Acid Cleaning Solution and Clean Water Rinse for Reuse (cont.)**

**NOTE 2**    *Placing the control switch for a valve or pump in AUTO may or may not illuminate the control switch and cause the valve or pump to operate depending on control logic*

**Operator**

- [1]    Verify that all appropriate prerequisite actions in Section 5 Prerequisites have been completed and recorded on CWTF Operations Log Book
- [2]    Don the appropriate PPE as required in the HASP
- [3]    Verify open MV-910
- [4]    IF transferring to TK-1  
      THEN open MV-968
- [5]    IF transferring to TK-2  
      THEN open MV-969
- [6]    Verify the SEAL FLUSH WATER PUMP TP-11-2 control switch is in AUTO
- [7]    Place the control switches for the following automatic valves in HAND
  - [A]    AV-911
  - [B]    AV-912 if transferring from TK-9
  - OR
  - [C]    AV-913 if transferring from TK-10
- [8]    Place the CLEANING PUMP CP-1 control switch in HAND to pump solution to the reaction tank
- [9]    Avoid overfilling the reaction tank (TK-1 or TK-2) by monitoring the level in the tank.

6.3.1 Transfer of Acid Cleaning Solution and Clean Water Rinse for Reuse (continued)

Operator (continued)

- [10] Monitor reaction tank pH if the system is operating and ensure the tank stays within the operating range as specified in 4-159-ENV OPS FO.41, Chemical Precipitation/Microfiltration Operations, Consolidated Water Treatment Facility
- [11] WHEN TK-9 OR TK-10 reaches low level  
THEN place the CLEANING PUMP CP-1 control switch in OFF
- [12] IF the system is NOT operating,  
THEN place the SEAL FLUSH WATER PUMP TP-11-2 control switch in OFF
- [13] Place the control switches for the following automatic valves in OFF
  - [A] AV-911
  - [B] AV-912 for TK-9 if placed in HAND in Step [7]
  - OR
  - [C] AV-913 for TK-10 if placed in HAND in Step [7]
- [14] Close or verify closed MV-968 AND MV-969

6.3.2 Transfer of Sodium Hypochlorite Cleaning Solution and Clean Water Rinse for Reuse

NOTE 1 *Placing the control switch for a valve or pump in HAND will illuminate the control switch, indicating the valve is open or the pump is running.*

Operator

- [1] Don the appropriate PPE as required in the HASP
- [2] Place electric drum pump in 12 in. opening at top of TK-9
- [3] Verify that the drum pump control switch is in OFF
- [4] Plug the drum pump power cord into a 120V receptacle
- [5] Attach a 1 in. polyethylene (poly) hose to the discharge of the drum pump
- [6] Run the poly hose from the drum pump into a clean empty 55 gal poly drum.
- [7] Place the drum pump control switch in ON and pump contents from TK-9 into the 55 gal drum.
- [8] WHEN the 55 gal drum is full,  
THEN place the drum pump control switch in OFF
- [9] Repeat Steps [6] through [8] until TK-9 is EMPTY
- [10] Fill a five gal plastic container with clean water for flushing the drum pump

**6 3 2      Disposal of Sodium Hypochlorite Cleaning Solution and Clean Water Rinse for Reuse  
(continued)**

**Operator (continued)**

- [11] Rinse drum pump and hose
  - [A] Place drum pump into the 5 gal rinse water container
  - [B] Rinse exterior of drum pump suction tube
  - [C] Run the poly hose from the drum pump into one of the 55 gal poly drums that has sufficient room to accept approximately 5 gal of flush water
  - [D] Place the drum pump control switch in ON and pump rinse water from the 5 gal container into the 55 gal drum
  - [E] **WHEN** the 5 gal container is empty  
**THEN** place the control switch for the drum pump in OFF
- [12] Store the electric drum pump in T900B
- [13] Record all activities in the CWTF Operations Log Book

**6 4      Plugged Modules**

**Operator**

- [1] Inform Lead Operator that modules must be cleaned and that an Integrated Work Control Package should be developed
- [2] Record all activities in the CWTF Operations Log Book

**7      POST-PERFORMANCE ACTIVITY**

**CWTF Responsible Manager**

- [1] Ensure that the original and one copy of the following quality-related records, as appropriate are transmitted to the ERPD Project File Center in accordance with 3-21000 ADM-17 01 Quality Assurance Records Management
  - Cleaning Log Sheet(s)
  - CWTF Operations Log Book
  - Work Packages as required
  - Qualification/Training Documentation, as required
  - Occurrence Reports as required

Submission of record copies to the ERPD Project File Center will satisfy Administrative Record requirements

There are no nonquality records generated by this procedure

Management of all records is consistent with 1-77000-RM-001 Records Management Guidance for Records Sources

**8. REFERENCES**

**Rocky Flats Environmental Technology Site, Consolidated Water Treatment Facility Health and Safety Plan**

**1-10000-HWR, Hazardous Waste Requirements Manual**

**1-77000-RM-001, Records Management Guidance for Records Sources**

**3-21000-ADM-17 01, Quality Assurance Records Management**

**4-I59-ENV-OPS-FO 41, Chemical Precipitation/Microfiltration System, Normal Operations, Consolidated Water Treatment Facility**

**4-I63-ENV-OPS-FO 45, Chemical Handling and Mixing Operations, Consolidated Water Treatment Facility**

**MICROFILTRATION SYSTEM  
CHEMICAL CLEANING OPERATIONS  
CONSOLIDATED WATER TREATMENT FACILITY**

4-I60-ENV-OPS-FO 42

**REVISION 1**

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## APPENDIX 1

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### OPERABLE UNIT 2 MICROFILTRATION UNIT CLEANING LOG

[illegible]